

ROENTGEN TREATMENT OF GOITRE.*

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Until we know more about the primary causes of goitre and have a working classification based on etiology, treatment must necessarily be more or less empirical and correspondingly unsatisfactory. Under present conditions it is not surprising that all treatments fail to secure the desired results in 10% to 20% of the cases. Rational treatment demands the removal of the cause and with our present information we cannot say whether the cause lies in stimuli from the central nervous system as Crile believes; or in a disturbed balance in the endocrine system due perhaps to an infectious process such as T. B.; to a developmental defect such as hyperplastic thymus or to a hypo- or hyperfunction of one of the other members of the chain.

Probably the best classification we have at present is that of the Mayos based on the pathology of their operative material.

The objection to it is that it necessarily cannot include the pathology of the other glands of the system which is at least as important as that of the thyroids themselves. However, by means of it the pathologists and clinicians have been able to correlate their findings in 80% of their cases.

Their scheme is very simple, they have two divisions, toxic and atoxic and these are each subdivided into hyperplastic and non-hyperplastic. Of these the most important are the non-hyperplastic atoxic, or simple goitres, which comprise 43.9% of all the cases. They are characterized by atrophic parenchyma, decreased function and a chronic course. Twenty-four per cent. of these degenerate into the second type, the non-hyperplastic toxic, which compose 13.3% of the cases, and with these the goitre appears on an average at the age of 22, and becomes toxic at the age of 36½ years. In these cases exophthalmos is rare.

Third, hyperplastic atoxic, which was represented in only .3% of the cases is of little importance. Most important of all is the hyperplastic toxic, or the exophthalmic type, which made up 42.5% of the cases. In these the goitre appeared at the age of 32, and toxic symptoms at 32.9 years. The curve of toxicity reaches its height toward the end of the first year and the process subsides in from two to four years, leaving traces in the way of damaged hearts, blood vessels and nerve tissues.

There are many other classifications, viz., exophthalmic, formes frustes, thymic, vagotonic, sympathicotonic, etc., but the Mayo scheme is probably the best.

Surgeons will not agree that toxic goitres should be treated medically when they have statistics proving 70% to 80% of cures as compared with 20% to 50% of cures by medical means, but as Roentgen rays come into more general use in these cases and similar statistics can be compiled by the Roentgenologists it will probably be found that their figures will not be far below those of the surgeon, while their mortality will be considerably lower.

The pathology of the exophthalmic type is essentially a primary parenchymatous hypertrophy

and hyperplasia; an increased amount of functioning parenchyma associated with increased absorption, frequently associated with hyperplasia of the thymus, especially in the fatal cases. Here, if ever, we have a condition peculiarly suited to Roentgen therapy—glandular tissues and especially vascular actively functioning ones are particularly susceptible to radio-activity and the thymus is violently so. We have an agent which can accomplish all that surgery can do—not all at one blow it is true, but gradually and none the less surely.

It will be objected that during the time necessary for treatment, toxic material is still being circulated and continuing the remote damage to heart, vessels and nerves. Time alone will show whether the objection is sound. It would seem as though the rapid improvement which occurs objectively in rayed patients, at times almost magically, would indicate an immediate diminution in the toxemia. They sleep better, feel better,—tremor and tachycardia diminish, they are not as nervous as before and they soon begin to put on weight.

It is further objected that radiation causes fibrosis so that subsequent operation is made more difficult. On the contrary, thickening of capsule and obliterative endarteritis should make it easier.

Just as sudden shock will at times start up an exophthalmos in a patient who was previously taking care of an excess of thyroid; so often a course of radiation will be all that is necessary to bring about the reverse process and carry him back over the critical point so that he is again able to neutralize his hyper secretion.

The literature shows a large number of reports of small series of cases treated with the rays with no attempt to classify the cases according to type and here is a point that hinders the Roentgenologist considerably in his study of this field—he has time for little more than a cursory history of the patient so that he must depend on the clinician who refers the case for the proper classification and study of the subsequent course of the patient. It means that the two men must work in closer touch.

Last year G. Schwartz, of the first medical clinic in Vienna, reported 40 cases in which after radiation the nervous symptoms always disappeared and the tachycardia nearly always. Two-thirds of his patients showed gain in weight, one-half regression of exophthalmos and one-third diminution in tumor.

Falta in his book on internal secretions says that he has seen several good results from radiation lately with disappearance of glycosuria, diarrhea and tremor and increase in weight.

Stoney reports 41 cases, 14 cured, 22 much improved.

Fisher reports 12 cases, seven as cured for two years, and five improved.

Case says that the response to treatment depends on rapidity of development of goitre,—the shorter its duration the better the result.

Kienböck, last spring in an article calling attention to the possibility of early hyper-reaction to ordinary dosage of rays and advocating moderate dosage until the patient has, in a measure, been standardized, concludes with the following quotation from Belot:

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"The X-rays give results in Basedow's disease equal to any treatment, even surgery itself. In the severe cases, the rays bring improvement and even a cure—one causes almost a true resurrection."

And this from Nagelschmidt: "No case of Basedow's should be operated on unless it has had energetic treatment with the rays first. Even when the indication for operation is clear—at the very worst the patient is put in better general condition by the rays. There is no doubt that the mortality of surgical treatment will be greatly reduced by previous Roentgenization."

The technic consists of an exposure of from a quarter to a third of an erythema dose, of hard rays through a 3 m.m. aluminum filter. If no reaction occurs the dose is cautiously increased until regression of symptoms occurs. Some patients at fairly heavy doses will develop sympathetic symptoms of nausea, malaise, temperature for three to four days followed by improvement immediately or during the next week. The improvement lasts 10 days to two weeks and then treatment is repeated. Each time they gain a little more and the beneficial results seem to continue for some time after treatment is stopped. Patients should not be accepted for a course of less than three months—at times a year will be necessary to secure results.

In the past year and a half we have had 24 cases, 10 pursued treatment for from three months to 11 months. Without exception they are improved as regards nervousness, sweating, tremor, sleeplessness, and weight.

One still complains of tachycardia at times.

Three showed great improvement in exophthalmos. At any rate the results are sufficiently encouraging to warrant wider application of the method and more careful study of the cases.

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Discussion.

Dr. W. W. Boardman: I should like to agree with the first speaker regarding the attitude of the surgeons. Most of them insist upon operating on all their cases of fibroids, so that, up to the present, very few of them filter through for X-ray treatment. At the Stanford clinic we have had two cases and in these two, the results have been very satisfactory. However, the patients have not been followed up long enough for any definite conclusions to be drawn. The technic used there follows that of the Freiburg school, using the Coolidge tube, the hard filtered rays and the cross-fire method. I feel convinced that the X-ray offers great possibilities in gynecologic work, especially in patients about the age of forty. The younger patients, I should feel inclined to leave to the surgeon. I fear also to take the cases in which the diagnosis is not altogether certain. We have all seen cases on the operating table which have demonstrated mistakes in pelvic diagnosis. It is

certainly very important to carefully watch the clinical course during treatment. Any unexpected happening should call for immediate investigation.

I believe that radiotherapy will be used more and more in gynecologic work and the fact that men of wide surgical experience abroad have practically abandoned surgery and adopted radiotherapy argues very strongly for this method. I can certainly agree with Dr. Ruggles as to the excellent results obtained in hyperthyroidism with the X-ray. I have seen several cases in the last few years in which there has been very decided temporary improvement. I say temporary because we have not as yet followed these cases long enough to know that it is permanent. I believe it is very important in treating these patients to put them at rest perfectly in the hospital. Also to search for and remove all points of focal infection—tonsils, teeth, sinuses, etc., as recently emphasized by Billings and Rosenow.

Dr. Saxton Pope: I have seen two cases, one where the treatment was given for menorrhagia and the other for fibroid. Both were greatly helped. After treatment of a year, I could not find the fibroid. The menorrhagia stopped completely. The treatment was very satisfactory to her, and it seems particularly applicable to that type of case.

Dr. Kreutzmann: I am very glad to hear of somebody else who now starts in to take that sort of treatment. I must say that I, personally, was at first (several years ago) a kind of disbeliever, but from what I have seen personally, and from study, I have become thoroughly convinced of the great possibility of the radioactive agencies. I believe that the wonderful curative action of all the different radio systems, of which the X-ray is only one, will revolutionize the practice of medicine. As Dr. Boardman has told you, not only in Germany, but in France, men of wonderful ability as operators—men like Krönig, one of the most skilful operators you could imagine; men like Doederlein and Bumm—have laid aside the knife and employ rays therapy. I had a very peculiar experience in Berlin. The chief of the Roentgen department, speaking of the question of fibroid of the uterus, said: "We have no interest in that any more. That is settled. We want now to make new investigations. What we are interested in now is treating malignant tumors with X-rays." Some men there who have conscience enough to know what they are doing, and who have observed enough, use radioactive substances not only in non-operative cases of carcinoma of the uterus, but in cases, favorable for operation. They say that in five years we will compare the results. I have seen, myself, a case of carcinoma of the uterus where the result was marvelous. Professor Doederlein said to me, when he showed me a number of cases: "If anybody told me what I am telling you now, I would not believe him. I would have to see it myself."

Dr. Ruggles: Dr. Hyman has asked about treatment of thymus cases. The thymic type will respond more readily than any of the others. The clinical side I have not been able to keep in very close touch with. The cases with which I have had the most success, have been referred as thymic patients. It is reasonable to suppose that they would react more easily than any others, because of the susceptibility of the thymus to radiation.

At Johns Hopkins, Barker and Halsted are enthusiastic about the Roentgen treatment of thyroid cases. Garré reported several years ago that 95% of the fatal cases of Graves disease showed persistent thymus at autopsy. Cases of hyperthyroidism, in which symptoms persisted after operation, were greatly improved when thymectomy was done subsequently. Impressed by this observation, they started radiation on several cases, which had not been benefited by operation. The improvement was so marked, that they have con-

tinued the treatment on their subsequent cases.

In the matter of future possibilities it is improvement in technic and apparatus which will give improvement in results. The Coolidge tube is a great help. That is a tube in which the current depends not upon a variable amount of gas in the tube, but upon the incandescence of a filament which can be maintained at a given point indefinitely.

The General Electric Company is now working on a tube of this type which will back up a 20" spark. The gamma radiation of radium corresponds roughly to a 15" or 17" spark. With the perfection of such a tube, the results of Roentgen treatment in all fields should be tremendously increased.

THE CONSERVATIVE TREATMENT OF FRACTURES OF THE LONG BONES AND OF WOUNDS COMPLICATING THEM—A PAPER IN ORTHOPEDIC SURGERY.

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PHYSIOLOGIC USE WITHOUT OVERWEIGHTING.

All surgeons are agreed that physiologic use is the best agent in assisting to make union solid. With fractures of the lower extremity it is good practice to let the patient walk as early as possible with a protecting brace or splint such as a Thomas caliper cut so long that the patient's heel just clears the ground. In certain cases a Hessing or a plaster of paris sheath splint may be employed. Other cases of malunion may be consequent upon a too imperfect reduction of a fracture or upon failure to maintain the parts in good position after a fracture has been reduced. Usually these commoner forms of malunion may be prevented by anticipating them in the setting.

It is always to be remembered that tenderness at the seat of a fracture means the callus is still soft and yielding. Not infrequently the patient complains that the deformity is growing worse.

If the callus will yield in one direction under one set of strains, it can be made to yield in another and opposite direction under another set of strains. Therefore not infrequently by either appropriate splinting or balancing or by actually re-breaking and again setting a limb, the deformity consequent upon malunion may be overcome.

THE CLAVICLE.

Fractures of the clavicle are often the result of direct violence, the blow being usually a shattering one. I have had occasion to cut down on a number of them, frequently to find that instead of a clean break I had to do with three fragments. Unless firm union is obtained such fractures may become the cause of much discomfort. As a rule patients recover with some deformity. The immediate end of treatment is to keep the shoulder well back and out. This assures proper alignment. The Sayre adhesive plaster dressing can be made to accomplish this. It is not comfortable, however. By far the most comfortable dressing is a combined plaster of paris cuirass and shoulder spica.

THE HUMERUS.

For fractures of either the anatomical or the surgical neck of the humerus Bigelow's dictum issued in 1844, "Pad in the axilla. Arm at the side. Hand in a sling," may usually be accepted. Especially is this so in old persons where the fracture is impacted. In those instances where the X-ray shows marked deformity, the upper fragment being displaced outward, an attempt at manipulative reduction should be made. To do this an assistant should make vigorous traction downward on the hand, then, without relaxing his pull, outward; and finally upward. The pull should be sufficient to separate the fragments. The surgeon then with one hand in the axilla and one on the arm can cause the rough surfaces to engage. Care should be taken that when they do this the lower fragment is rotated out sufficiently to permit the hand to be placed on the back of the head.

In accordance with the surgical principle that a fracture near a joint should be immobilized in that position which is ordinarily attained with the greatest difficulty, where there is a fracture of the sort just considered one would naturally fix the arm in the extreme of abduction and elevation with moderate external rotation. This is Dr. Whitman's procedure and was the one employed heretofore by the writer. Mr. Jones advises, however, that after the bones have engaged the arm should be gently brought to the side and immobilized in the usual way.

Fracture of the shaft of the humerus may be complicated by injury to the musculo-spiral nerve, or by the inclusion of this nerve in the callus. In such an event to operate is the only alternative. I have had only one such case. The most efficient dressing I have employed was a plaster of paris spica applied to the shoulder, the arm and the forearm, the latter being flexed to a right angle. While the splint is being applied, downward traction should be maintained on the arm by means of a loop of bandage passed around the flexed forearm and held by the operator's foot so as to prevent overriding of the fragments.

THE ELBOW JOINT.

Fractures of the olecranon should be immobilized in full extension. With this exception all injuries about the elbow joint should be put up in supination and extreme flexion.

In this way the coronoid process is made to fill up the coronoid fossa, thus keeping it clear of callus, while the tendon of the triceps forms a sling about the broken parts holding them together. The flexion is maintained by an adhesive strap surrounding forearm and arm and the limb is suspended from the patient's neck by a bandage round the wrist.

I have in the past two years treated nine elbow fractures in this way with functionally perfect results. All except one were in children. In one other case flexion occurred at the site of fracture. Here an incision was made over the external condyle and the gloved finger introduced into the wound and behind the fracture. In this way the